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New detrital zircon geochronology from the Cycladic and Pelagonian terranes (Greece): implications for the Paleozoic paleo-reconstructions of peri-Gondwanan terranes accretion to Laurussia

Olga Zlatkin (1), Dov Avigad (2), and Axel Gerdes (3)

(1) Department of Geography and Environment, Bar-Ilan University Ramat Gan, 5290002, Israel (olga.zlatkin.mail@gmail.com), (2) Institute of Earth Sciences, The Hebrew University of Jerusalem, Jerusalem 91904, Israel, (3) Institute of Geosciences, Goethe-University Frankfurt, Altenhoeferallee 1, 60438 Frankfurt am Main, Germany

On a regional scale, two fundamental pre-Variscan geological domains are distinguished in the NE Mediterranean region: the Internal domain, which hosts Ordovician-Devonian (450-400 Ma) igneous rocks and detrital zircon population of this age, and the External domain, which contains no such ages. The latter domain includes the Pelagonian terrane and the External Hellenides in Greece. The former holds more internal position (closer to Baltica) and includes the Serbo-Macedonian Massif, and the Istanbul and Sakarya terranes. The two domains are considered as two consequential Paleozoic accretionary belts attached to the southern margin of the East European (Baltica) Craton.

The Cycladic and Pelagonian terranes are currently juxtaposed along-strike of the central Hellenides in northern Greece. The Pelagonian terrane is an Avalonian-type terrane, while the Cycladic Massif displays a Cadomian-type provenance. On the other hand, the Pelagonian terrane is lacking Caledonian (Ordovician-Devonian: 450-400 Ma) zircon ages, while detrital zircon grains of these ages are abundant in the Cycladic Massif. In this study, the Ordovician-Devonian detrital zircon population is also recognized in pre-Variscan (>310 Ma) crustal vestiges within the Cycladic Basement from Ios and Naxos.

The finding of the indicative Ordovician-Devonian detrital zircon population in the Cycladic Basement indicates its affinity with the Internal domain. This also suggests that the Cycladic Cover Series were deposited in a Mesozoic oceanic basin located within the Internal domain, i.e. northeast of the Pelagonian terrane. This recognition helps to reconstruct the paleogeography of the Eastern Mediterranean peri-Gondwanan terranes during the Paleozoic and Mesozoic.